

# trends in the microRNA marketplace

In this article, a recent market analysis is discussed aimed at understanding the market landscape, trends and opportunity in the rapidly-expanding microRNA marketplace. These market analyses are presented in detail in a recently-published MicroRNA 2008 market report.

**M**icroRNAs are receiving extensive research attention lately given their putative role in a number of different biological processes. Almost every single life science research journal has published papers relating to microRNAs in different biological processes and it is important to note that these papers address topics such as various cancers, stem cells, embryonic development, biomarkers for different disease areas (especially cancer), and the role of microRNAs as oncogenes or tumour suppressors. In short, microRNAs appear to impact a variety of biological processes and the fact that a given microRNA may impact several genes implies that microRNAs can affect entire biological pathways and alter a biological state. This is the primary reason microRNA research is growing exponentially – researchers worldwide are finding that microRNAs affect their biological system and they are beginning to study them.

The market landscape for microRNAs is uncharacterised for the following reasons:

- They represent a brand-new research area.
- New research tools are being developed to study them, or existing technologies are being retooled.
- The research is happening across the globe.
- The research is happening across various disciplines – basic science, research into microRNAs and other small non-coding RNAs, cancer researchers from the clinic, vendors seeking to develop diagnostics and therapeutics.

Select Biosciences has addressed this need and has published recently its MicroRNA 2008 Market Report (publication date: January 2008). This report covers the technology and business areas in the microRNAs space with emphasis upon the market landscape and the various products impacting the marketplace. Also contained in the report is primary market analysis data derived from end-user surveys that have been performed on researchers and end-users worldwide – these surveys have enabled the identification of qualitative and quantitative market trends and are reported along with unmet market needs and opportunities.

**By Kathy Gray and  
Dr Enal Razvi**

## **MicroRNA**

MicroRNA market analyses performed by Select Biosciences that are presented in its recent market report cover the following topics:

### **CHAPTER I. EXECUTIVE OVERVIEW OF THE MICRORNA SPACE**

- Introduction to microRNAs
- microRNA Biosynthetic Steps
- Precursor versus Mature microRNAs
- Mechanism of Action
- microRNAs and other Non-coding Small RNAs
- Comparison of microRNAs and siRNAs
- microRNAs Described in Various Species
- Criteria used to Identify Novel microRNAs
- Online Resources for microRNA Target Predictions
- Expression Patterns of Mammalian microRNAs
- microRNAs and Biological Pathways
- microRNAs Implicated in Disease
- microRNAs Associated with Human Cancer
- microRNA Expression Profiling in Human Cancers
- Virus-encoded microRNAs
- microRNAs and their Targets
- Argonaute Proteins
- Growth and Evolution of the microRNA Space

### **CHAPTER II. PRODUCTS AND SERVICES FOR MICRORNA RESEARCH**

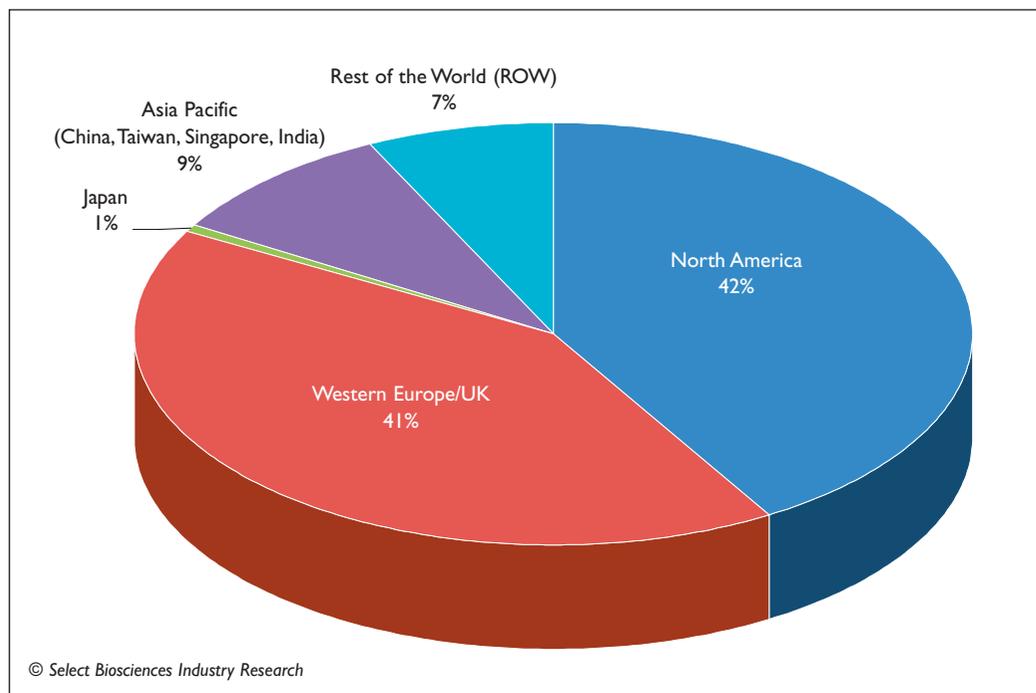
- Market Segments of microRNA Research
- Products and Services in Each Market Segment

### **CHAPTER III. MICRORNA MARKET ANALYSIS**

- microRNA Research Trends
- Market Segmentation
- microRNA Research Quantitative Metrics (Nr. Of Experiments Performed, Growth)
- microRNA Expression Profiling Marketplace
- End-user/Application Segments for microRNA Research
- Penetrance of Products/Services into microRNA Research Market
- Preferred Tools Suppliers/Vendors
- microRNA Reagents Usage Metrics
- microRNA Microarray Marketplace
- Non-coding RNAs Market
- Emerging Trends in microRNA Research
- Challenges in microRNA Research
- Unmet Product Needs in microRNA Research
- microRNA Vendor Advertising Channels
- Growth and Evolution of the microRNA Space

### **CHAPTER IV. MICRORNA-BASED DIAGNOSTICS AND THERAPEUTICS: INDUSTRY TRENDS/DYNAMICS**

*Source: Select Biosciences MicroRNA 2008 Market Report*



**Figure 1**  
Geographic distribution of researchers surveyed

### Primary market analysis – the microRNA marketplace

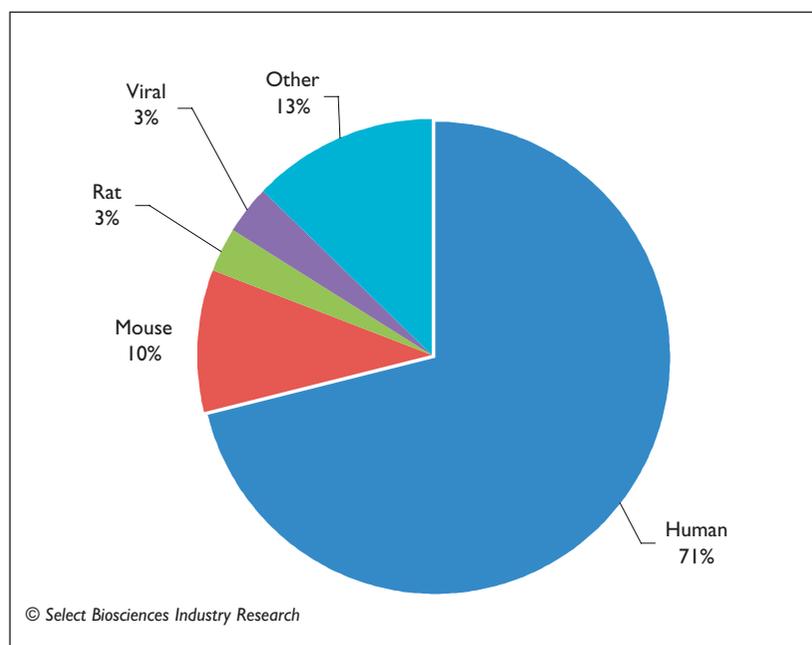
Select Biosciences performed end-user surveys of researchers worldwide to understand their research practices. The researchers surveyed represented the global community and therefore our conclusions from these analyses can be extrapolated to the worldwide research community. **Figure 1** presents the geographic distribution of researchers that we surveyed.

We wondered what kinds of areas the microRNA research community was focused upon today in their research efforts. The data presented in **Figure 2** show that the majority of research efforts are happening in human, followed by mouse models. These data show that the majority of research, as well as many of the tools developed by the various vendors, are designed for studies on human microRNAs, even though many researchers are studying mouse and they are requesting the vendors to produce these research tools. As in many other life science research areas, the studies on model organisms need to be supplemented with research on human cells and this accounts for the trends seen in **Figure 2**. Also driving the use of human cells and microRNAs is the research interest on microRNAs in human cancers.

In order to more fully map the various research activities in the microRNA space, we sought to classify researchers in terms of their primary research activity with respect to microRNAs. The results are presented in **Figure 3**.

Note from **Figure 3** that the majority of the research community is studying microRNAs in cancer. When we analysed our data we found that this trend was operative at all geographic locations. Indeed, these results argue that the primary entry point for microRNA research tools vendors is in offering products geared at understanding the biology of microRNAs as they relate to cancer. There is a significant percentage of researchers

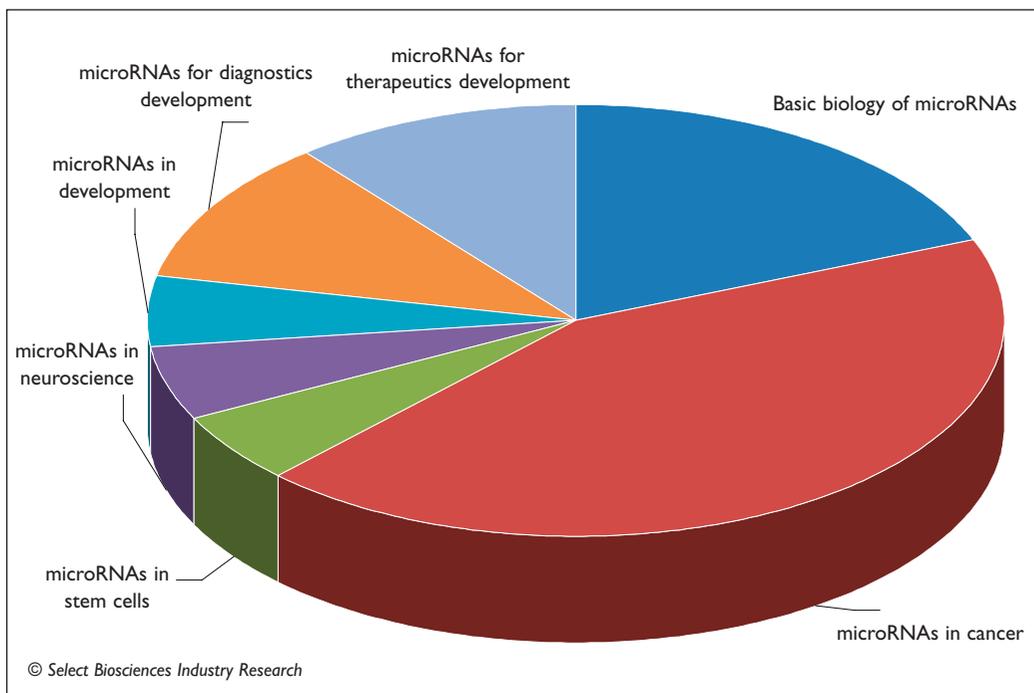
**Figure 2**



## MicroRNA

**Figure 3**

Breakout of researchers worldwide in their studies utilising microRNAs. What topics/areas are they studying microRNAs for?



that are involved in studying microRNAs with the intent of developing diagnostics and therapeutics – we believe that the fraction of these researchers will grow over time as more biomarkers (microRNA signatures) are discovered with association to particular disease areas and as therapeutic targets. Indeed, this is a trend we are observing strongly – the deployment of specific microRNAs into *in vivo* model systems where their biological significance can be studied and

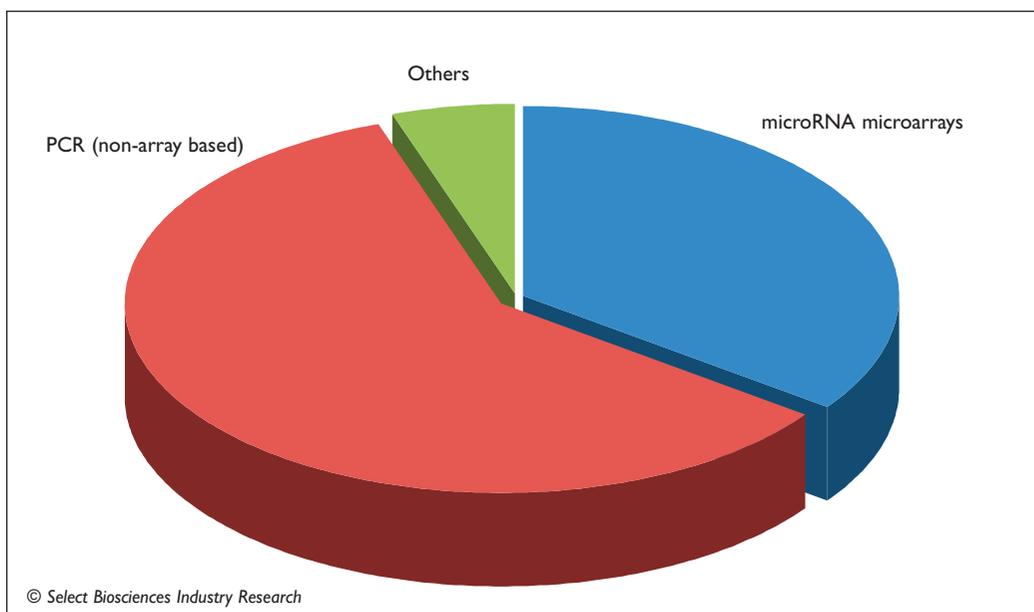
potentially their role as determinants in cancer and utility as biomarkers.

### The research workflow

The current research workflow in microRNA space involves microRNA identification and cloning. This is done by a variety of means and most of the public-domain microRNAs are deposited into the miRBase database administered by the Sanger Center in the UK (<http://microrna.sanger.ac.uk/>). miRBase is the

**Figure 4**

MicroRNA expression profiling market segmentation by type of technology utilised



new home of microRNA data on the web, providing data previously accessible from the miRNA Registry. The miRBase Sequence Database is a searchable database of published microRNA sequences and annotation. The miRBase Registry continues to provide gene hunters with unique names for novel microRNA genes prior to publication of results. The miRBase Targets Database is a new resource of predicted microRNA targets in animals.

Following *in silico* studies, researchers are moving towards microRNA expression profiling in their research samples – this is an area of significant revenue generation for the vendors in the microRNA research tools space and our report documents the various companies and their product offerings in detail. **Figure 4** presents the breakout of the microRNA expression profiling market with respect to the types of technology platform utilised.

Note that PCR-based methods (predominantly qRT-PCR) are the mainstay of microRNA expression profiling today with a number of different market participants (see next section). The power of this approach is the adaptability that it affords – a given microRNA can be platformised into an assay very quickly. This flexibility is not possible with microRNA microarrays.

### Vendors offering products into the microRNA research space

As part of our industry coverage, we have mapped the competitive landscape – companies offering products and services into the microRNA marketplace. **Figure 5** illustrates a snapshot of this mapping where we present various microRNA research categories and indicate into which of these categories the different vendors offer their products and services.

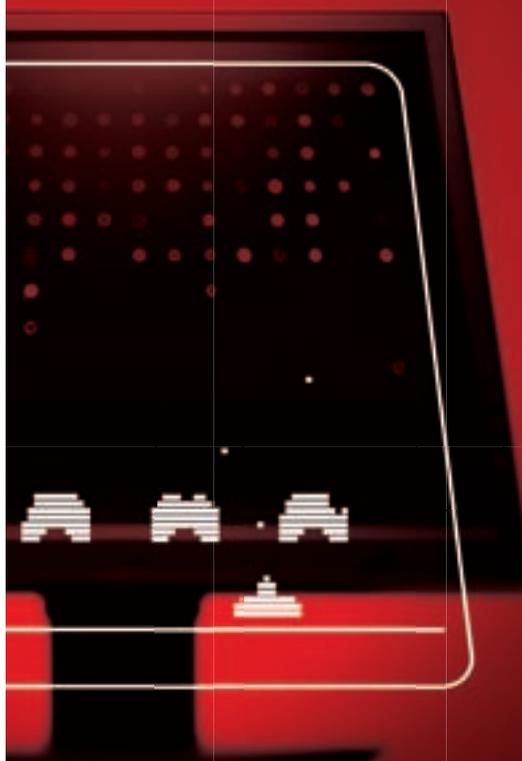
More details about the various product or service offerings of each vendor are presented in the full report.

In summary, in this article we have sought to frame some of the market parameters of the evolving microRNA marketplace. Our continuing coverage of this marketplace enables us to identify trends and market opportunities, especially those emerging in the microRNA-based diagnostics and therapeutics spaces.

More details about this report can be found at <http://www.selectbiosciences.com/marketreports/MicroRNA08MarketReport.aspx> **DDW**

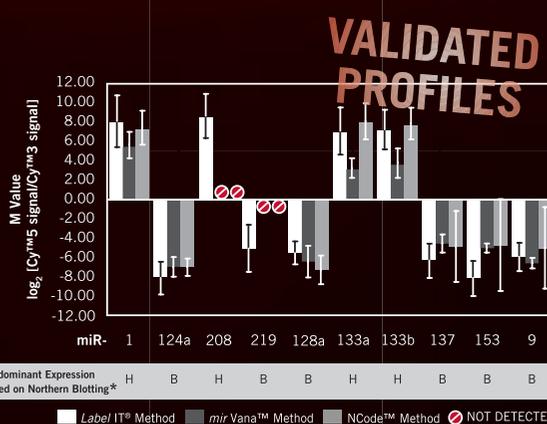
*Kathy Gray is a biotech veteran with 25 years' experience in the biotechnology industry. She is the worldwide co-ordinator for Select Biosciences*

## ACCURATE MICRORNA EXPRESSION PROFILING



### MISS NOTHING

**Label/IT® miRNA Labeling Kit** accurately detects all microRNAs in a sample – including those our competitors systematically miss.



\*Sempere, L.F., et al. *Genome Biol.* 2004; 5(3): R13.

**Mirus**

\*Sempere, L.F., et al. Expression profiling of mammalian microRNAs uncovers a subset of brain-expressed microRNAs with possible roles in neuronal differentiation. *Genome Biol.* 2004; 5(3): R13.

It All Begins at the Bench

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## MicroRNA

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**Figure 5:** Vendors into the microRNA research space (for products and services) and the market segments they serve

MARKET SEGMENT VENDOR	DISCOVERY AND CLONING	ISOLATION AND PURIFICATION	LABELING AND DETECTION	EXPRESSION PROFILING	FUNCTIONAL ANALYSIS
Ambion/ABI		X		X	X
Asuragen				X	
Cepheid					X
Exiqon				X	
Febit				X	
GenoSensor				X	
IDT	X				
Invitrogen				X	
LC Sciences				X	
Miltenyi				X	
Mirus			X		
Ordway Research Institute				X	
Promega					X
QIAGEN		X		X	
SBI	X			X	X
Stratagene/Agilent		X		X	
ThermoFisher					X
USB/Affymetrix			X		

Source: Select Biosciences Industry Research